

Remarks/Arguments

Claims 1-28, all the claims pending in the application, were rejected as unpatentable over Applicants' Admitted Prior Art in view of Sugawara, U.S. Patent No. 5,849,424 (Sugawara). For the reasons discussed below, this rejection is respectfully traversed.

The primary reference, Applicants' Admitted Prior Art, was cited for the general disclosure of the existence and structure of thermal fuses. Office action of May 6, 2005, page 2, line 16, to page 3, line 2.

For Applicants' Admitted Prior Art, the Office refers to the specification: Fig. 5; p. 1, lines 10-27; and p. 11, lines 1-12. It is respectfully pointed out that there is no page 11 in the application. The application only contains 10 pages and six figures, which are on three additional unnumbered pages. Further, "column 5, lines 65-67 and column 6, line 7 and 8," also cited by the Office as disclosing Applicants' Admitted Prior Art, are not part of the applicants' specification. The Office appears to be referring to some other publication, possibly to Sugawara, not to applicants' specification. The disclosure of "column 5, lines 65-67 and column 6, line 7 and 8" is not part of Applicants' Admitted Prior Art.

Sugawara, the secondary reference, discloses a process for producing a layer of copper alloy having high surface hardness on the surface of copper by (1) coating the surface of a copper alloy with a layer of tin or a tin alloy, and (2) heat treating the coated copper alloy to form on the surface thereof a high hardness coating containing Cu-Sn intermetallic compounds. Sugawara, Abstract. The resulting coated copper alloy has a high surface hardness and improved resistance to abrasion and corrosion, which permits producing terminal connectors there from. *Id.*

1. *Sugawara is Not Analogous Art*

The Court of Appeals for the Federal Circuit has held that for reference to be combined to create a *prima facie* case of obviousness it must be "analogous art." For a reference to be analogous art it must either (1) be from the same field of endeavor, regardless of the problem addressed; or (2) be reasonably pertinent to the particular

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problem with which the inventor is involved. See, *In re Clay*, 23 USPQ2d 1058 (Fed. Cir. 1992).

The Office asserts that the references are from the same field of endeavor, "tin covered electrical connectors and devices employing them". This assertion is respectfully traversed.

"Tin covered electrical connectors and devices employing them" is not a field of endeavor. Electrical connectors, which includes Sugawara, and electrical devices, which includes applicants' invention, are two separate and distinct art areas. Because of their different uses, they have different use requirements. Connectors, for example, are subject to constant insertion and withdrawing and must be highly resistant to abrasion and delamination and should have decreased friction during the insertion and withdrawing process. See, Sugawara, column 1, lines 10-32. Thermal fuses have no such requirements. Unlike electrical connectors, they are not constantly inserted and withdrawn. Instead, they need a fusing temperature that has minimum variability. Specification, page 1, line 25, to page 2, line 12.

Even assuming for the sake of argument that there is such a field of endeavor as "tin covered electrical connectors and devices employing them," Sugawara is not from this field of endeavor. As has been discussed in previous responses, and will be discussed in more detail below, Sugawara is not from this field because his connectors are not "tin covered." Although something that might be considered "tin covered" is produced during an intermediate step in their formation, the connectors are covered with "a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu_3Sn [about 39 wt% tin] and Cu_4Sn [about 32 wt% tin]." See, Sugawara, column 6, lines 32-35 (calculated wt% tin added) Connectors whose layer contains at most 39 wt% tin in a Cu-Sn intermetallic compound can not be considered to be "tin covered."

Therefore, the Office has not made the *prima facie* case. Sugawara is not analogous art, and may not be combined with Applicants' Admitted Prior Art to produce a *prima facie* case of obviousness. For this reason, the rejection of claims 1-28 as unpatentable over Applicants' Admitted Prior Art in view of Sugawara should be withdrawn.

2. *There is No Motivation to Combine the References*

To prevent the use of hindsight to defeat patentability of an invention, the Federal Circuit "requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." In *re Rouffet*, 47 U.S.P.Q.2d at 1457-8; *see also, In re Dembiczak*, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). Assuming for the sake of argument that the references can be combined, there is no motivation to combine the references.

The Office asserts that Sugawara disclose a lead connector having surface layer of tin for improving workability and corrosion resistance. Office action of May 6, 2005, page 3, lines 3-5. Therefore, the person of ordinary skill in the art would combine the references to improve workability and resistance to corrosion of the lead connectors. *Id.*, lines 10-14. This assertion is respectively traversed.

As mentioned above, Sugawara discloses a two step process:

- (1) Coating the surface of a copper alloy with a layer of tin or a tin alloy, and
- (2) Heat treating the coated copper alloy to form on the surface thereof a high hardness coating containing Cu-Sn intermetallic compounds.

Sugawara, Abstract.

A copper alloy with a layer of tin or a tin alloy is formed in the first step. Sugawara, column 5, line 52, to column 6, line 8.

In the second step, the copper alloy with a layer of tin or a tin alloy is heated at a temperature in the range 100°C to 600°C for 0.5 to 24 hr. Sugawara, column 6, lines 21-28. "As a result of the heat treatment, Cu diffuses from the alloy body into the surface coating, to provide a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu₃Sn and Cu₄Sn. *Id.*, lines 32-35.

The Office asserts that the person of ordinary skill in the art would combine the references to improve workability and resistance to corrosion of the lead connectors. However, the copper alloy with a layer of tin or a tin alloy, formed in the first step, does not have these improved properties. Only after the second step, heating to form intermetallic compounds such as Cu_3Sn and Cu_4Sn , are the improved properties present.

In short, the structure that the Office claims the person of ordinary skill in the art would be motivated to produce does not have the improved properties that the Office claims would motivate the person of ordinary skill in the art to produce it. These improved properties are not present until after the surface coating has been converted from a copper alloy with a layer of tin or a tin alloy to something else, namely a coated alloy having a high hardness surface coating containing Cu-Sn intermetallic compounds, such as Cu_3Sn and Cu_4Sn .

Again, Sugawara was cited for features disclosed by Sugawara before heating. The motivation to combine Sugawara with the admitted prior art is based on features which do not appear in Sugawara until after heating. The motivation to combine is thus unrelated to Applicants' claimed features. How can "motivation to combine" exist when the claimed features are no longer present in the prior art?

Therefore, the Office has not made the *prima facie* case. Selectively picking disclosures without a full appreciation of what the reference teaches is improper. Consequently, there is no motivation to combine Sugawara with Applicants' Admitted Prior Art to produce a *prima facie* case of obviousness. For this additional reason, the rejection of claims 1-28 as unpatentable over Applicants' Admitted Prior Art in view of Sugawara should be withdrawn.

3. *Sugawara teaches Away for the Invention*

Instead of teaching the superiority of the copper alloy with a layer of tin or a tin alloy, Sugawara teaches away from the invention. Sugawara teaches that:

With the recent development of the electronics industry, electric wiring in various machines is becoming more and more complicated and highly integrated, and this has caused use of connectors having an

increased number of pins. Conventional connectors having Sn-plated surfaces have encountered a problem in that the practical use thereof is becoming more and more difficult because of the increased friction at the times of insertion and drawing.

Currently available electric automobiles require charging at least once a day. Thus, it is necessary that a charging-socket is highly resistant to abrasion. In addition, since a large amount of electric current such as 10A or more flows in sockets and therefore a large amount of heat is generated, a new problem that Sn-plated surfaces of sockets obtained by a conventional method cannot withstand the delamination of the plated surface has occurred.

Sugawara, column 1, lines 26-41 (emphasis added).

Sugawara expressly discloses two specific disadvantages of tin plated surfaces:

- (1) increased friction, and
- (2) delamination.

Therefore, the person of ordinary skill in the art, would not be motivated to combine Applicants' Admitted Prior Art with Sugawara to produce a tin plated surface because Sugawara teaches the disadvantages of a tin plated surface.

The Office has not made the *prima facie* case. A reference that teaches away from an invention can not make it obvious. Consequently, Sugawara can not be combined with Applicants' Admitted Prior Art to produce a *prima facie* case of obviousness. For this additional reason, the rejection of claims 1-28 as unpatentable over Applicants' Admitted Prior Art in view of Sugawara should be withdrawn.

4. *Claims 19-23*

Claims 19-23 are each drawn to a thermal fuse. Each claim recites a specific composition for the surface layer. These claims have been rejected as merely the result of "routine experimentation." This rejection is respectfully traversed.

Numerous other chemical elements, at wide ranges of concentrations, may be present in alloys. Sugawara, for example, discloses various ranges for 21 elements that may be present in copper alloys to improve properties such as strength, elasticity, and workability without decreasing the electrical conductivity of the base copper alloy. Sugawara, column 5, lines 4-37.

Most research inherently involves "experimentation." However, discovery of these particular compositions is more than routine given the large number of chemical elements, combinations of chemical elements, and ranges of concentrations for these chemical elements that are possible. For this reason, the rejection of claims 19-23 are the result of routine experimentation should be withdrawn.

Further, as shown in Figure 6, the surface layers having the claimed compositions and a thickness between 14 microns and 2 microns produce about half the variation in fusing temperature than the comparative examples. For this additional reason, the rejection of claims 19-23 are the result of routine experimentation should be withdrawn.

5. *Claims 10-18 and 24-28*

Claims 10-18 and 24-28 were rejected as "inherently necessitated" by the device structure as taught by the combination of Applicants' Admitted Prior Art and Sugawara. This rejection is respectfully traversed.

For the reasons stated above, the combination of Applicants' Admitted Prior Art and Sugawara is improper. As the combination is improper, the rejection is not "inherently necessitated" by this combination and should be withdrawn.

Further, the Office has not made a record to support the assertion that the rejection is "inherently necessitated" by the combination of Applicants' Admitted Prior Art and Sugawara. See, *In re Lee*, 61 USPQ 1430, 1432-34 (Fed. Cir. 2002) (agency findings must be supported by the record); see also, 37 CFR 1.104(c)(2) (particular part of reference relied upon must be designated as nearly as practicable). The Office has not explained how a device structure can inherently necessitate rejection of fourteen different method claims. For this additional reason, the rejection of claims 10-18 and 24-28 as "inherently necessitated" by the device structure as taught by the combination of

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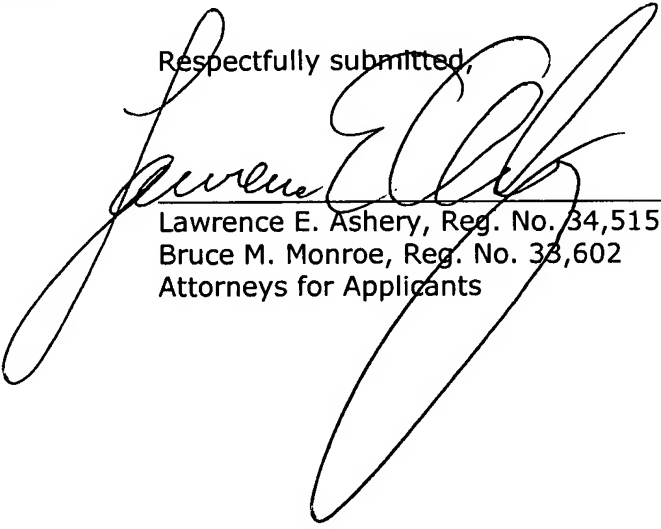
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Applicants' Admitted Prior Art and Sugawara should be withdrawn.

Conclusion

It is respectfully submitted that the claims are in condition for immediate allowance and a notice to this effect is earnestly solicited. The examiner is invited to phone applicant's attorney if it is believed that a telephonic or personal interview would expedite prosecution of the application.

Respectfully submitted,


Lawrence E. Ashery, Reg. No. 34,515
Bruce M. Monroe, Reg. No. 33,602
Attorneys for Applicants

LEA/ds/fp/ds

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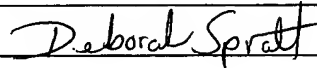
P.O. Box 980
Valley Forge, PA 19482
(610) 407-0700

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